

MIO helical plate: technically easy, improving biology and mechanics of “double plating”

P. Regazzoni, S.M. Perren, A. Fernández

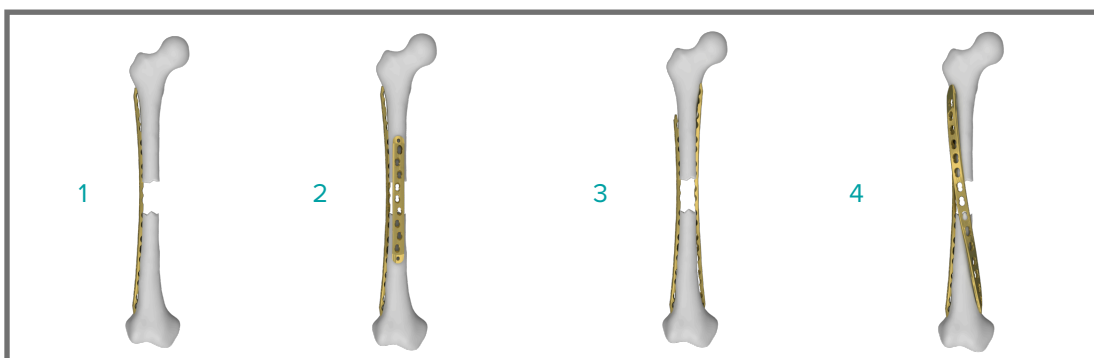
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A single plate, bridging a bone defect, e.g. in the distal femur, risks irreversible deformation or breakage. Double plating, i.e. the addition of a second parallel plate (1) (2), served early on to protect by strengthening the construct. The added stiffness reduced mobility and the risk of non-union. The mechanical advantage provided was uncontested, but the biological damage – both for the access for plate placement and the vascular damage by the old plate types, fixed to the bone by friction - was disturbing. What was called “stress protection” is today understood as contact necrosis produced by conventional contacting plates (3) (4). Internal remodelling of the necrosis resulting in temporary porosis and/or weak newly formed bone resulted in a refracture risk after simultaneous removal of both plates I disqualifying conventional double plating (5). The development of “internal fixators” (= non-contacting locked plates) resolved this problem but still requires additional exposure for plate placement.

The helical plate is an internal fixator that requires no additional exposure of the fracture site, is technically easy to prepare and needs minimal additional exposure and it replaces the missing remote cortical support (opposite to the main lateral implant) by acting as a kind of tension/compression band with good leverage. From a small medial exposure, the helical plate is inserted through the submuscular space reaching the existing proximal exposure for the lateral implant. Both ends of the helical plate are fixed to bone with only two screws thus not requiring additional exposure or tooling for aiming.

When considering the different options for double plating for comminuted distal femur fractures the following aspects need to be considered:

- Effect on bone vascularity
- Invasiveness of access for plate placement
- Technical difficulty
- Construct mechanics



1. Lateral implant alone.
2. Lateral and anterior implant (90°).
3. Lateral and medial implant (180°).
4. Lateral and MIO-helical implant .

Helical plates – introduced with MIO technique – seem to be the adequate modern solution of double plating in distal femur as they offer the following advantages:

- Distal fixation on the medial side (short incision).
- Proximal fixation laterally (same incision as for main lateral implant).
- Minimal additional soft tissue damage.
- Technically simple, mechanically efficient, biologically sound.
- No bone graft.
- No access to non-union.

[> 16 cases documented in the ICUC® app](#)



32-CO-456 *
33-EA-272 *



32-CO-580



32-CO-538 *



32-CO-111 *



32-SI-436



32-SI-985



32-SI-022



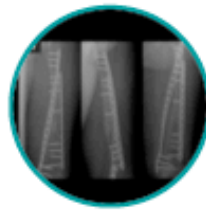
32-SI-372



32-SI-236



32-SI-449



32-SI-328



32-SI-250



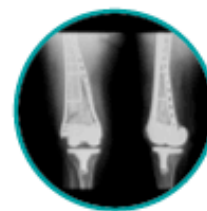
32-WE-087



32-EA-729



32-EA-563 *
Right and left



32-EA-436

* Cases commented by members of the ICUC expert board. These comments can be found in the [ICUC app](#)

Case of a 85 year-old patient, with bilateral non-unions and implant failures.

ICUC® app ID: 23-EA-563.

ID: 33-EA-563 / 85y



Overall Assessment: To be discussed

AO: 33-A3

PSA

Poly-trauma

SURGICAL APPROACH

Bilateral approach. LISS + LCP helix.

SUMMARY

Implant removal. No compression, no bone graft. Early weight bearing allowed as tolerated after 2w.

DISPLACEMENT



COMPLEXITY



REDUCTION



IMPLANT POSITION



Complete Articular

Extra Articular

Partial Articular

No bone graft. No touch non-union site.

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FURTHER READINGS

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